

## Antibacterial Activity of Leaf Extracts from *Sauropus albicans* Blume. (Kyet-Tha-Hin)

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### Abstract

The leaves of *Sauropus albicans* Blume. (Kyet-Tha-Hin) belonging to Phyllanthaceae were collected from Myeik Area of Taninthayi Region on March, 2018. The leaf samples were air-dried and powdered for extraction. The dried ripe fruits with the parasitic microorganisms of *Capsicum frutescens* L. (Nga-Yoke) belonging to Solanaceae were collected from the market of Myeik for the isolation of the parasitic microorganisms. The outstanding characters of these plants were investigated. The leaf powders (10 g for each solvent) were extracted with 100 ml of acetone, ethanol, methanol and water on water-bath at 80°C. These extracts were tested the antimicrobial activity on the isolated parasitic microorganisms by paper disc diffusion method. According to the antibacterial activity, the best extract (50 mm of inhibitory zone) was selected for separation of extracted compound by paper chromatography with the four solvent systems. According to the results of paper chromatography, the selected extract of *Sauropus albicans* Blume. will be investigated the different chromatographies for the purification of extracted compound.

Key words: leaf extracts, isolated parasitic microorganisms, antimicrobial activity, chromatography

### Introduction

Plants have been playing an important role in alternative medicine since ancient times. Many of these plants are used as chemical feed stocks or as raw material for many scientific investigations and they are commercially important especially in pharmaceutical industry. Plants are important source of antimicrobial compounds and traditional healers has long used. Plants are to prevent or cure infectious diseases. Phytochemicals are the active chemical components of plants and some phytochemicals including tannins, alkaloids, terpenoids and flavonoids possess antimicrobial activity. Some antioxidant dietary supplements also contain phytochemicals (polyphenols) such as grape seed extract and demonstrate *in vitro* antibacterial properties. With the increasing antibiotic resistance in recent years, the potential of new plant-derived antibiotics is under investigation (Zeidan, 2013).

In Indonesia, the leaves of *Sauropus albicans* Blume. are used to make infusion, believed to improve the flow the of breast milk for breastfeeding mothers. It is a good source of vitamin K. However, a study has suggested that the excessive consumption of juiced leaves (due to its popularity for body weight control Taiwan) can cause lung damage due to its high concentration of the alkaloid papaverine. It also has high level of pro-vitamin A, carotenoids especially in freshly picked leaves as well as high level of vitamin B and C, protein and minerals. The more the leaves mature, the higher the nutrient content of the leaves. Latest studies indicate that it encouraged the rapid regeneration multiplication through organogenesis and somatic embryogenesis (Ghosh, 2008).

Therefore, the present study was designed to evaluate the antimicrobial activity of *Sauropus albicans* Blume. extracts against the parasitic microorganism from *Capsicum frutescens* L. Aim and objectives of this study are to study the outstanding characters of *Sauropus albicans* Blume. (Kyet-Tha-Hin), to investigate the extraction from the leaves of this plant with various solvents, to isolate the parasitic microorganisms from the dried ripe fruits of *Capsicum frutescens* L. and to

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study the antimicrobial activity of leaf extracts on parasitic microorganisms from the dried ripe fruits of *Capsicum frutescens* L..

## Materials and Methods

### Collection of specimen

*Sauropus albicans* Blume. (Kyet-Tha-Hin) belonging to Phyllanthaceae was collected from Myeik Area in March, 2018. The dried ripe fruits of *Capsicum frutescens* L. (Nga-Yoke) belonging to Solanaceae were collected from the market of Myeik for the isolation of the parasitic microorganisms. The outstanding characters of these plants were investigated.

### Preparation for extracts

These fresh leaves were air-dried, powdered and subjected to extract. The leaf powders (10 g) were extracted with 100 ml of the solvents such as acetone, ethanol, methanol and water on water-bath for 6 hrs at 80°C. Then, filtration was done through filter paper. Filtrates were collected in a beaker and dried up to semisolid using water-bath.

### Preparation for test organisms

The parasitic microorganisms were isolated from the dried ripe fruits of *Capsicum frutescens* L. (Nga-Yoke) on nutrient agar medium (Sucrose 1.0 g, Yeast Extract 0.3 g, Peptone 0.3 g, Agar 1.8 g, Distilled Water 100 ml) by direct inoculation method. The parasitic bacterium and fungi were separately re-cultured and the pure culture was transferred into the liquid medium (Sucrose 0.5 g, Yeast Extract 0.15 g, Peptone 0.15 g, Distilled Water 50 ml) for test organisms.

### Testing the antimicrobial activity

Semisolid extracts were utilized for the antibacterial and antifungal assay by the paper disc diffusion method on the parasitic microorganisms. The paper discs (6 mm of filter paper) were soaked in extracts and dried for testing the activity.

One drop of parasitic bacterium and fungi were separately cultured in assay medium (Sucrose 1.0 g, Yeast Extract 0.3 g, Peptone 0.3 g, Agar 1.8 g, Distilled Water 100 ml) before solidification. After solidification, the dried paper discs with extracts were put on assay plate for 24 hrs at room temperature.



Fig 1. Procedure for the extraction from the leaves of *Sauropus albicans* Blume. (Kyet-Tha-Hin)

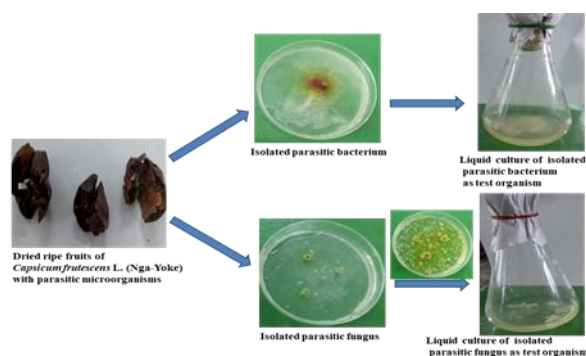


Fig 2. Procedure for isolation of parasitic microorganisms from dried ripe fruits of *Capsicum frutescens* L. (Solanaceae) as test organisms

## Results

### Outstanding characters of *Sauropus albicans* Blume. (Kyet-Tha-Hin) (Phyllanthaceae)

Shrubs, branchlets angular. Leaves alternate, simple, entire, petiolate, stipule simple. Inflorescences mostly in axillary, staminode usually lower on the branches, pistillate usually apically; flowers axillary, solitary, pedicellate, unisexual, actinomorphic, greenish red, hypogynous, bracteate. Calyx 6 lobes, discoid, green to gradually red; Petals absent. Stamens in staminate 3, filaments combined in a very short truncate 3-gonous column, anther sessile on the angles of the column. Carpels in pistillate (3); ovary ovoid, fused, trilocular, axile placentation. Fruits with a fleshy epicarp. Seeds subglobose, glabrous.

### Outstanding characters of *Capsicum frutescens* L. (Nga-Yoke) (Solanaceae)

Annual or perennial shrubs, stem densely branched. Leaves simple, alternate, elliptical to lanceolate, margin entire, stipulate, petiolate. Inflorescences terminal; flowers axillary, white, campanulate, bisexual, regular, hypogynous, bracteate, sessile. Calyx 5, campanulate, minute, nerved. Corolla greenish white, glabrous, tube short, deeply 5-partite, lobes valvate. Stamens 5 at the apex of corolla tube, filaments glabrous, the anthers ditheous, basifixed, oblong, longitudinal dehiscence. Ovary 2, style linear, stigma subcapitate, axile placentation. Berry pendent oblong often curved a pale yellow and mature to a bright red with many seeded, pungent. Seeds subglobose, compressed, embryo curved.



Fig 3. Habit and flower of *Sauropus albicans* Blume. (Kyet-Tha-Hin)

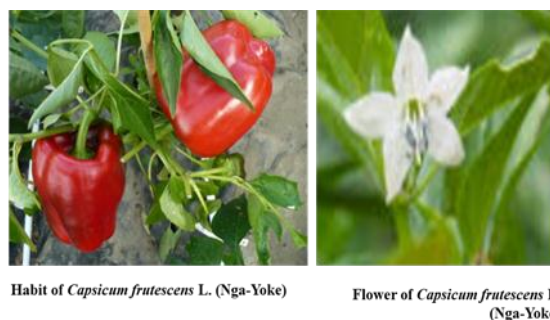


Fig 4. Habit with fruits and flower of *Capsicum frutescens* L. (Nga-Yoke)

Table - Antimicrobial activity of leaf extracts on parasitic microorganisms from *Capsicum frutescens* L. (Nga-Yoke)

Leaf Source	Solvents for Extracts	Activity on Parasitic Bacterium	Activity on Parasitic Fungus
<i>Sauropus albicans</i> Blume.	Acetone	No Activity	No Activity
	Ethanol	No Activity	No Activity
	Methanol	No Activity	No Activity
	Water	50 mm of clear zone	No Activity

The watery extract from the leaves of *Sauropus albicans* Blume. (Kyet-Tha-Hin) showed the best antibacterial activity (50 mm of inhibitory zone) on the parasitic bacterium from *Capsicum frutescens* L. (Nga-Yoke). The other acetone, ethanol and methanol extracts from the leaves of *Sauropus albicans* Blume. (Kyet-Tha-Hin) showed no antibacterial activity on the parasitic bacterium from *Capsicum frutescens* L. (Solanaceae). Moreover, all extracts from the leaves of *Sauropus albicans* Blume. (Kyet-Tha-Hin) showed no antifungal activity on the parasitic fungus from *Capsicum frutescens* L. (Nga-Yoke).

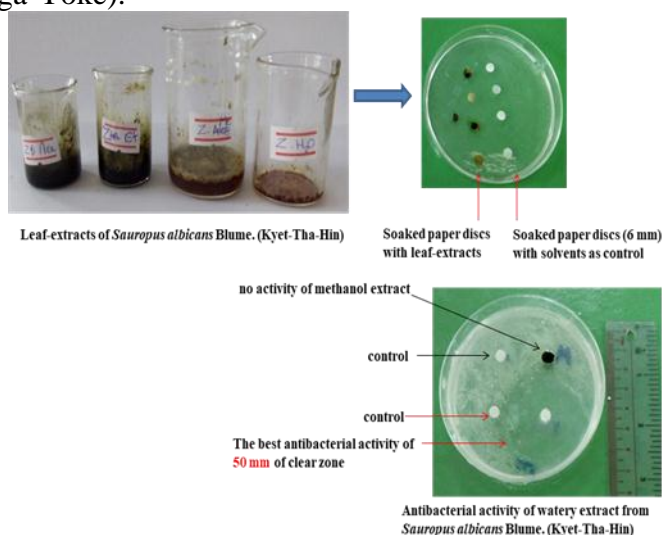


Fig 5. The best antibacterial activity of watery extract from *Sauropus albicans* Blume. (Kyet-Tha-Hin)

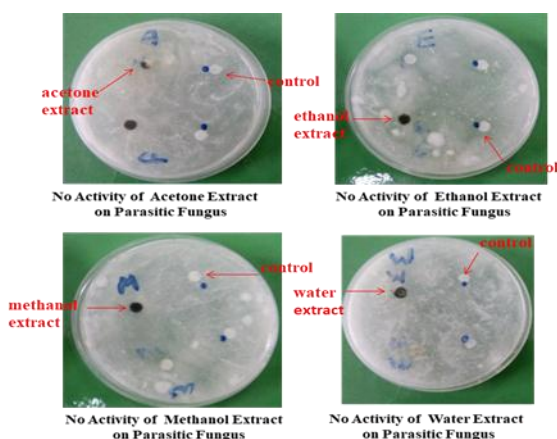


Fig 6. No antifungal activity of all extracts on parasitic fungus from *Capsicum frutescens* L. (Nga-Yoke)

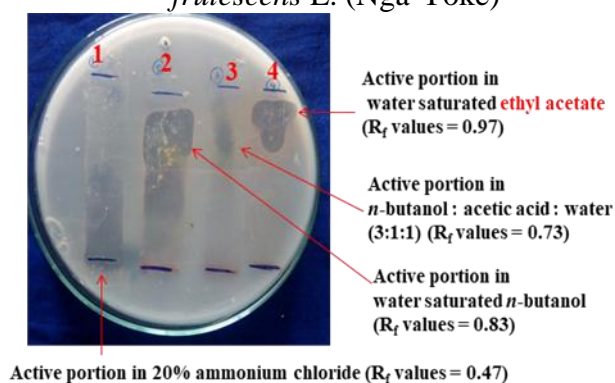


Fig 7. Bioautography of watery extract by paper chromatography using four solvents system on parasitic bacterium

## Discussion and Conclusion

*Sauropus albicans* Blume. is one of most popular leaf vegetables in South East Asia and is notable for high yields and platability. The shoot tip had been sold as tropical asparagus. In Vietnam, the locals cook it with crab meat, minced pork or dried shrimp to make soup. In Malaysia, it is commonly stir-fried with egg or anchovies. The flowers and small fruits of the plant have also been eaten (Ghosh, 2008).

The acetone, ethanol, methanol and watery extracts from the leaves of *Sauropus albicans* Blume. (Kyet-Tha-Hin) belonging to Phyllanthaceae were tested the antimicrobial activity on the parasitic microorganisms isolated from the dried ripe fruits of *Capsicum frutescens* L. (Nga-Yoke) belonging to Solanaceae. Among them, the watery extract from the leaves of *Sauropus albicans* Blume. (Kyet-Tha-Hin) showed the best antibacterial activity of 50 mm of inhibitory zone on the parasitic bacterium from *Capsicum frutescens* L. (Nga-Yoke). The acetone, ethanol and methanol extracts from the leaves of *Sauropus albicans* Blume. (Kyet-Tha-Hin) showed no antibacterial activity on the parasitic bacterium from *Capsicum frutescens* L. (Nga-Yoke). Moreover, all extracts from the leaves of *Sauropus albicans* Blume.

(Kyet-Tha-Hin) did not show the antifungal activity on the parasitic fungus from *Capsicum frutescens* L. (Nga-Yoke).

The successful outcome of antimicrobial therapy with antibacterial compounds depends on several factors. These include host defense mechanisms, the location of infection and the pharmacokinetic and pharmacodynamic properties of antibacterial. A bactericidal activity of antibacterial may depend on the bacterial growth phase and it often requires ongoing the metabolic activity and division of bacterial cells. Antibiotics are commonly classified based on their mechanism of action, chemical structure or spectrum of activity and most target bacteria functions or growth processes. Plants are important source of potentially useful structures for the development of new chemotherapeutic agents. The first step towards this goal is *in vitro* antibacterial activity assay. Many reports are available on the antiviral, antibacterial, antifungal, antianthelmintic, antimolluscal and anti-inflammatory properties of plants. Some of these observations have helped in identifying the active principle responsible. However, not many reports are available on the exploitation of antifungal or antibacterial property of plants for developing commercial formulations for applications in crop protection (Mahesh, 2008).

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